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Before the
FEDERAL COMMUNICATIONS COMMISSION
 Washington, D.C. 20554

DEC 16 1994

FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

In the Matter of)

TELEPHONE COMPANY-CABLE)
 TELEVISION Cross-Ownership)
 Rules, Sections 63.54 - 63.58)

CC Docket No. 87-266

and)

Amendments to Parts 32, 36, 61)
 64, and 69 of the Commission's)
 Rules to Establish and Implement)
 Regulatory Procedures for Video)
 Dialtone)

RM-8221

COMMENTS OF COMPRESSION LABS, INC.

Compression Labs, Inc. ("CLI"), by its undersigned counsel, hereby submits its Comments on the Commission's *Third Further Notice of Proposed Rulemaking* in the above captioned proceeding.^{1/} As a provider of digital equipment used by video service providers including video dialtone providers, CLI thoroughly understands the technical, economic, and operational issues raised by the use of digital compression and transmission equipment to meet the video dialtone requirements.

CLI is a leading provider of digital compression and transmission equipment in the rapidly expanding video communications market. CLI's Compressed Digital Video ("CDV") technology digitizes and compresses full-motion video signals for transmission over telephone, satellite, and cable television networks. CLI also is developing a set-top video dialtone decoder

^{1/} *Memorandum Opinion and Order on Reconsideration and Third Further Notice of Proposed Rulemaking*, FCC 94-269 (released November 7, 1994) (*Third FNPRM*).

("VDT II") that converts compressed digital video/audio signals to analog video/audio for viewing on conventional television sets already in use.

Since the Commission adopted its *Video Dialtone Decision* in July 1992,^{2/} over 35 Section 214 applications have been filed by the local exchange carriers ("LECs") requesting authority to provide video dialtone service. In these applications, LECs propose to construct advanced, broadband telecommunications networks capable of providing over 7 million households with competitive broadcast video services, interactive digital video services, and, in certain cases, voice and data services. Clearly, these applications will further the Commission's public interest goals of an advanced telecommunications infrastructure, competition in the video and communications markets, and diversity of video services.^{3/} Achievement of these goals, however, is at risk unless the Commission expeditiously approves the pending video dialtone applications.^{4/} Further, by acting on the pending video dialtone applications, the Commission will send a clear signal to equipment manufacturers that a market will exist for digital compression and transmission equipment used to provide video dialtone service.

^{2/} *Second Report and Order, Recommendation to Congress, and Second Further Notice of Proposed Rulemaking*, 7 FCC Rcd 5781 (1992) (*Video Dialtone Decision*).

^{3/} The public interest benefits of video dialtone also could be realized by non-traditional LECs (*i.e.*, competitive local service providers) offering video dialtone service. Although the Commission's *Video Dialtone Decision* was aimed at allowing the traditional LECs -- those LECs subject to the statutory ban against providing video programming to subscribers within their service areas ("cable/telco ban") -- to participate in the video marketplace, there is no valid reason for limiting the video dialtone approach to the traditional LECs. Indeed, the Commission's public interest goals would be further by competitive local service providers offering video dialtone service.

^{4/} To date, the Commission has approved only eight applications, seven of which are for limited video dialtone trials.

CLI fully supports the Commission's technology-neutral approach to video dialtone expressed in its *Video Dialtone Decision*.^{5/}

[W]e emphasize that we do not require or promote any particular technology or network architecture, nor do we stipulate any technical parameters or impose a minimum broadband switching requirement. Video dialtone is technology-neutral; it addressed the barriers that hinder the development of a competitive video marketplace and the efficient deployment of new broadband technologies by the local telephone companies, and defines the regulatory guidelines for the local telephone companies' video distribution services, regardless of the technology used. In fact, we anticipate wide variation in how different local telephone companies may choose to implement video dialtone.

Without reference to a specific technology, the Commission required the LECs that offer video dialtone service to provide a common carrier platform with sufficient capacity to serve multiple video programmers. The platform must be capable of expanding to meet increases in demand for capacity. In its *Third FNPRM*, the Commission acknowledged, for the first time, that there may be technical limits on providing sufficient analog capacity to serve multiple video programmers. While the LECs may be able to provide sufficient digital capacity to serve multiple video programmers, the Commission raises certain concerns about the availability and commercial feasibility of digital compression and transmission equipment, requiring subscribers to purchase set-top converters to view digital video programming, and the quality of compressed digital video programming.

CLI submits these Comments to address the Commission's concerns about the technical, economic, and operational feasibility of digital compression and transmission equipment. Generally, the technology to provide compressed digital video programming to subscribers is available today. For example, CLI currently provides MPEG real time encoding systems for

^{5/} *Video Dialtone Decision*, 7 FCC Rcd at 5806, n. 104.

consumers that allow them to receive and decode high quality compressed digital video programming offered over the Hughes DirecTV and United States Satellite Broadcasting ("USSB") direct broadcast satellite ("DBS") systems. CLI also will provide digital set-top converters to Bell Atlantic for its Dover Township, New Jersey, commercial video dialtone offering. CLI has invested a significant amount of time and funds in the development of digital set-top converters for video dialtone systems. However, due to the continued uncertainty surrounding the pending video dialtone applications, CLI's investment in the digital compression and transmission equipment for video dialtone is at risk. CLI therefore urges the Commission to act expeditiously on the pending applications.

In these Comments, CLI addresses the following four issues raised by the Commission in its *Third FNPRM*: 1) availability of digital compression and transmission equipment; 2) quality of compressed digital video programming; 3) cost of digital set-top converters; and 4) methods for sharing analog capacity among video programmers.

Digital Compression and Transmission Equipment Will Be Commercially Available in 1995 and the Cost of Such Equipment Will Decrease Over the Next Several Years

Affordable digital compression and transmission equipment depends upon the availability of very large scale integrated circuits ("ICs") required to operate highly complex processes necessary to demodulate and decode the compressed video signals. First generation MPEG-2 video and audio decoder ICs are already available. Second generation MPEG-2 ICs will be available in the near future.

For digital broadcast signals, an encryption and conditional access security standard is necessary. Because manufacturers typically view signal security as proprietary, they are reluctant to be make their signal security architecture available at competitive rates. For

example, General Instruments, the largest provider of encryption and conditional access systems, has restricted access to its architecture, which provides for the assignment and passing of the encryption keys. By restricting access (or requiring a monthly per subscriber service fee and extraordinary high license fees), General Instruments has retained a competitive advantage over its competitors and assured itself of a continuing revenue stream. The General Instruments' system provides just one illustration of the overall problem of not having an open architecture, standards-based, conditional access system. Until such a standards-based conditional access system is implemented, a competitive broadcast digital video programming market will not be able to fully develop on a broad scale.^{6/} In contrast to broadcast digital video programming, switched digital programming does not present the same conditional access security concerns. In a switched digital network, all channels do not appear simultaneously on a single broadband transmission medium, but instead, each subscriber individually connects to the programming desired. Compressed digital video signals are provided to subscribers on demand. Because the transmission path is unique to each individual subscriber, encryption is not required (conditional access is inherent in the network architecture). The number of channels that can be supported by a switched digital network is virtually unlimited.

^{6/} In contrast, the European Launching Group, a consortium of European broadcasters, government regulators, and manufacturers, has adopted a signal security and conditional access standard called the Digital Video Broadcasting ("DVB") "Simulcrypt." Through DVB Simulcrypt, individual programmers uniquely encrypt and authorize their material within a common subscriber decoder. Consequently, all programmers, theoretically, have access to all subscribers employing this standard conditional access method.

The Quality of Compressed Video Programming Equals or Exceeds the Quality of Analog Programming

The quality of compressed video programming depends upon the available bandwidth and the amount of information that is transmitted. The amount of information transmitted is, in turn, dependent upon the number of pixels changing from one frame to the next (motion) and the resolution of the frame to be transmitted (number of total pixels to be processed). For networks employing Asymmetric Digital Subscriber Line ("ADSL") technology in which the bandwidth may be limited to 1.5 Mbps, the resolution of the video signal is reduced. The lowest resolution standard (140x352 pixels) is generally employed in 1.5 Mbps transmission channels. At this bandwidth and resolution, CLI has produced equipment that provides acceptable video quality for movie based material (quality comparable to that of a pre-recorded video using a VHS recorder).

Higher bandwidth channels allow increased resolution and improved motion handling capability. Compression Labs is currently producing its Magnitude™ line of real-time broadcast encoders that provide MPEG video streams from 1.5 to 15 Mbps, at resolutions ranging from 480x356 to 704x356.^{2/} When coupled with Compression Labs set-top decoders, CLI has been able to produce excellent video quality at 544x356 resolution and data rates of from 3.5 Mbps for film based material to 6.5 Mbps for sports material. Consequently, it is our opinion that video quality will not suffer by the introduction of digital compression into the network. Rather, when compared to analog transmissions on most current cable systems, the compressed digital video will be of better quality (*i.e.*, will have a higher signal to noise ratio).

^{2/} A resolution of 704X356 is full CCIR601 digital standard resolution (the highest possible for NTSC transmission).

Digital Set-Top Converters Are Expected To Cost Between \$250 and \$350 by 1997

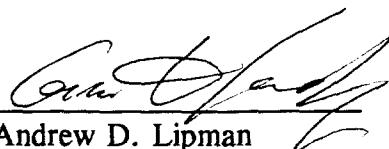
Compression Labs has already shipped over two-hundred products providing real time, high resolution compressed digital video encoders to customers, such as Hughes DirecTv and USSB. These encoders were delivered at competitive prices enabling direct satellite-to-home broadcast throughout the continental United States. RCA is offering a \$699 receiver package at retail. Thus far, based upon initial market reception, it appears that these services are being well received by the public. CLI currently offers cable and telephone based set-top units at prices comparable to that of the RCA satellite receiver. A version of our set top unit will be used in Bell Atlantic's Dover Township, New Jersey, video dialtone service. As more large scale integrated circuits become available, economies of scale are achieved, and competition expands, the cost of the set top unit will decline rapidly. Our goal is to produce a set-top converter that we will offer at retail at a price of \$250 - \$350 by 1997.

Due To the Limitations On Providing Analog Capacity, the Sharing of Analog Capacity Would Ensure Non-Discriminatory Access By Multiple Video Programmers

CLI believes that a hybrid analog - digital approach that would be able to support existing analog programmers and also new, interactive video programmers. By analog video programming sharing the analog capacity, the video dialtone system would be able to support multiple video programmers. As the cost of digital compression is reduced, video dialtone providers will be able to migrate to an all-digital network.

CONCLUSION

CLI believes that digital compression and transmission equipment are technically, economically, and operationally feasible today. By allowing the marketplace to develop unconstrained by a lengthy Section 214 application process, the Commission will ensure that consumers will benefit from another competitive source of video programming. We therefore urge the Commission to act expeditiously on the Section 214 applications and to allow the marketplace to operate to bring the service to the consuming public.



Andrew D. Lipman
Gene DeJordy
SWIDLER & BERLIN, Chartered
3000 K Street, N.W. - Suite 300
Washington, D.C. 20007
202-424-7500

Attorneys for **Compression Labs, Inc.**

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